

Claims

I claim:

1. A high strength low density panel comprising:

5 a plurality of box shaped sections, each said box shaped section having an upper face opposite a lower face, said upper and lower faces each having a midpoint, said upper and lower faces each having four corners, said upper face further comprising a continuous band of material extending from each corner of said upper face to an opposite corner of said upper face through a point proximate to said midpoint of said upper face, and said lower face further comprising a continuous band of material extending from each corner of said lower face to an opposite corner of said lower face through a point proximate to said midpoint of said lower face;

10 each box having four corner edges, each corner edge extending from about each corner of said upper face to about a corresponding corner of said lower face, said corner edges each comprising a continuous column of material extending from said upper face to said lower face;

15 each box having a central axis running from a point positioned at about said midpoint of said upper face to a point positioned at about said midpoint of said lower face, each box further comprising a central column of material positioned proximate and substantially parallel to said central axis;

20 each box further comprising a plurality of void spaces, said void spaces having an interior, a base and an apex, said void spaces having a longitudinal axis extending from said base to said apex, said void spaces positioned within said box with said longitudinal axes of each said void space substantially parallel to said central axis.

2 A high strength low density panel according to claim 1 wherein said boxes are positioned

in said panel in rows and columns.

3. A high strength low density panel according to claim 2 wherein said boxes further comprise a plurality of side panels extending between and encompassing each corner edge and extending from said upper face to said lower face of each said box, whereby a solid perimeter of material is formed around each box.

4. A high strength low density panel according to claim 3 wherein said boxes are positioned within said panel relative to each other so that the side panels of one box join with the side panels of each adjacent box, whereby an interlocking plurality of substantially perpendicular braces is created within said panel.

10 5. A high strength low density panel according to claim 2 wherein each said box further comprises a pair of cross panels, each cross panel extending from one of said corner edges to an opposite corner edge, said cross panels of each box intersecting proximate to said central axis of said box, each said cross panel further extending from said upper face to said lower face of said box.

15 6. A high strength low density panel according to claim 5 wherein said boxes are oriented with respect to each other within said panel so that each box is rotated about ninety degrees about its central axis with respect to each adjacent box.

7. A high strength low density panel according to claim 6 wherein said boxes are positioned within said panel relative to each other so that the cross panels of one box join with the cross panels of each corner box, whereby an interlocking plurality of diagonal braces is created within said panel.

20 8. A high strength low density panel according to claim 7 wherein said boxes further comprise

a plurality of side panels extending between and encompassing each corner edge and extending from said upper face to said lower face of each said box, whereby a solid perimeter of material is formed around each box.

9. A high strength low density panel according to claim 8 wherein said boxes are positioned within said panel relative to each other so that the side panels of one box join with the side panels of each adjacent box, whereby an interlocking plurality of substantially perpendicular braces is created within said panel.

10. A high strength low density panel according to claim 5 wherein said boxes are positioned within said panel relative to each other so that the cross panels of one box join with the cross panels of each corner box, whereby an interlocking plurality of diagonal braces is created within said panel.

15. A high strength low density panel according to claim 10 wherein said boxes further comprise a plurality of side panels extending between and encompassing each corner edge and extending from said upper face to said lower face of each said box, whereby a solid perimeter of material is formed around each box.

20. A high strength low density panel according to claim 11 wherein said boxes are positioned within said panel relative to each other so that the side panels of one box join with the side panels of each adjacent box, whereby an interlocking plurality of substantially perpendicular braces is created within said panel.

25. A high strength low density panel according to claim 1 wherein each said box further comprises a pair of cross panels, said cross panels of each box intersecting proximate to said central axis of said box, each said cross panel further extending from said upper face to said lower face of

said box.

14. A high strength low density panel according to claim 1 wherein said apexes of said void spaces are concave with respect to said interiors.

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15. A high strength low density panel according to claim 1 wherein said void spaces are further positioned so that said base and said apex of each void space are inverted with respect to said base and said apex of each radially adjacent void space within said box.

16. A high strength low density panel according to claim 15 wherein said apexes of said void spaces are positioned between said upper face and said lower face.

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17. A high strength low density panel according to claim 16 wherein said upper face further comprises at least one solid section of material extending from two of said corners of said upper face to about said midpoint of said upper face.

18. A high strength low density panel according to claim 17 wherein said solid section of material in said upper face is positioned over one of said apexes of said void spaces oriented toward said upper face.

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19. A high strength low density panel according to claim 18 wherein said apexes of said void spaces are concave with respect to said interiors.

20. A high strength low density panel according to claim 16 wherein said lower face further comprises at least one solid section of material extending from two of said corners of said lower face to about said midpoint of said lower face.

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21. A high strength low density panel according to claim 20 wherein said solid section of material in said lower face is positioned over one of said apexes of said void spaces oriented toward said lower face.

22. A high strength low density panel according to claim 21 wherein said apexes of said void spaces are concave with respect to said interiors.

23. A high strength low density panel according to claim 1 wherein each said lower face is rotated about ninety degrees about said central axis with respect to the corresponding upper face within each box.

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24. A high strength low density panel according to claim 1 wherein each said upper face of each box is about the same shape and size as the lower face of the same box.

25. A high strength low density panel according to claim 1 wherein each said void space has a length that is less than half the length of said central axis.

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26. A high strength low density panel according to claim 1 wherein said void spaces are filled with sound dampening material.

27. A high strength low density panel according to claim 1 wherein said void spaces are filled with flame retardant material.

28. A high strength low density panel according to claim 1 further comprising a laminated surface covering said upper faces of said boxes.

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29. A high strength low density panel according to claim 1 further comprising a laminated surface covering said lower face of said boxes.

30. A high strength low density panel according to claim 1 wherein said panel has at least one curved surface..